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ON LOGARITHMIC ERRORS.

By PROF. H. A. HOWE, Denver, Col.

Mr. R. S. Woodward has kindly sent me the results of his computations of the average errors of interpolated values, dependent upon first differences, where the interpolating factor has the values 0.1, 0.2, . . . 0.9. I have compared these theoretical values with the values given by a discussion of the 1000 examples mentioned in No. 6 of Vol. I of the ANNALS. The comparison is given below:

Interpolating factor.	Theoretical errors.	Actual errors.	Difference, $T-A$.
0.1	0.320	0.338	— 0.018
0.2	0.303	0.288	+ 0.015
0.3	0.304	0.321	— 0.017
0.4	0.290	0.268	+ 0.022
0.5	0.333	0.324	+ 0.009
0.6	0.290	0.276	+ 0.014
0.7	0.304	0.321	— 0.017
0.8	0.303	0.289	+ 0.014
0.9	0.320	0.347	— 0.027

The agreement of the theory with the observations is quite close, for the errors are carried to thousandths of a unit of the last place of the logarithm tables employed. It is strange that the differences are all negative (except one) when the interpolating factor is odd, and all positive when the factor is even. Furthermore, those actual errors which should be identical theoretically agree very closely.

It appears that the table given on pp. 126–7 of Vol. I does not represent well either the probable or the average errors, for the separate values of x, the interpolating factor. Hence the approximate theory developed in my articles, while it gives fair results, when general averages are taken, is not to be trusted for separate values of x.

It is to be hoped that Mr. Woodward may find time to prosecute further his admirable researches in this direction, and apply his theory to a variety of problems.